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CONSUMPTION AND SALES OF MILK AND DAIRY PRODUCTS 1/

This article introduces 2 new series--sales of manufactured dairy products by product weight and total sales on milk equivalent bases. The milk equivalent data have been computed on a solids-not-fat basis and a total solids basis. Though the U.S. Department of Agriculture has published estimates on milk and dairy products consumption for about 3 decades, interest in sales information has been stimulated by the availability of additional sales data in Federal and State marketing areas and the need for analyzing supplies marketed or sold to consumers.

These new series have been developed for 3 reasons: (1) Dairy farmers and dairy firms are interested primarily in commercial sales rather than national consumption of milk and dairy products. (2) The rapid changes in consumption of home-produced milk on farms with milk cows have made national consumption data an inadequate measure of changes in market demand. (3) The increase in use of dairy products containing a large proportion of solids-not-fat, relative to the high-milkfat products, has made the measurement of consumption by milk equivalents, fat solids basis, less satisfactory than formerly.

Background of Consumption Estimates

The primary estimate of milk and dairy products consumption in the United States is civilian disappearance--total and national average per capita for various individual items. Civilian domestic disappearance normally is the estimate of consumption and is derived from annual supply (production, imports, beginning stocks) by subtracting stocks at end of the year, exports and shipments to U.S. territories, nonfood uses (such as animal feed), and military food uses. Consumption data are reported in the following categories: Consumed on farms where produced, under USDA school milk programs, under USDA donation programs, and from commercial sources (i.e., all other disappearance). Consumption from commercial sources includes consumption through food stores, as well as away-from-home eating places.

Milk and dairy products consumption are measured in 2 ways: (1) In terms of product weight for individual products and the milkfat and solids-not-fat in all products combined. This method of measurement does not account for all milk processed, since some milkfat and large amounts of solids-not-fat are lost in processing or used for products fed to animals. (2) In terms of milk equivalent, fats solids basis. This method affords a common denominator for measuring national utilization of milk production, regardless of whether farmers sell milk wholesale as whole milk or cream or at retail as fluid products. 2/ The fat solids basis is used in preference to the solids-not-fat basis for this purpose because the fat portion of milk sales is almost completely reported. Fat is a higher-priced component of milk than solids-not-fat and 96 percent is used directly for humans compared with 73 percent for solids-not-fat.

The milk equivalent of consumption (fat solids basis) is the quantity of producer milk at average milkfat test required to supply the milkfat in a product. For example, 21.6 pounds of milk with 3.7 percent fat are required for 1 pound of butter. One must recognize that the milk solids content of milk may differ from one time to another. Thus, 100 pounds of milk in one year may yield a different amount of product than in another year. For example, in 1950, U.S. milk contained 3.96 percent milkfat compared with 3.71 percent in 1965. The estimated total solids content in these years was 12.69 percent in 1950 and 12.33 percent in 1965.

1/ Prepared by Robert H. Miller, Economic and Statistical Analysis Division, ERS, under the direction of A. G. Mathis, Head, Dairy Section.

2/ Harry C. Trelogan, "Ways of Looking at the Adequacy and Interpretation of USDA's Milk Statistics." Talk presented at Sixth National Symposium of Dairy Market Development, February 14-15, 1966.

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Although effective for accounting for milk production, use, and consumption, milk equivalent data do not measure commercial demand very precisely. This is the primary interest of dairy farmers and dairy firms. Further, since dairy products contain differing proportions of fat and solids-not-fat, shifts in demand for individual products change the character of overall demand more than is shown by milk equivalents. For these purposes a product weight basis or total solids basis of accounting for commercial demand seems more appropriate than the milk equivalent basis.

Fluid Product Sales Already Estimated

To dairy producers and processors, milk sales data which estimate the commercial utilization have considerable economic significance. The Economic Research Service estimates annual U.S. fluid milk product sales to show changes since 1950. These sales are estimated for the total U.S. resident population, both civilian and military, but exclude population on farms with milk cows. These data afford a closer approximation of the commercial market for fluid milk and cream products than total consumption data. They are reported earlier in this Situation.

Total fluid milk product sales are based on annual consumption data from the Statistical Reporting Service in milk equivalent terms (fat solids basis). Estimated quantity of sales by product groups are based on reported sales in Federal order markets. These sales estimates are derived data and, therefore, not precise measurements of the actual level of consumption. For 1965, the Federal order data used for total fluid sales estimates cover about 50 percent of the estimated total U.S. sales. Although a larger proportion of U.S. sales are reported for regulatory purposes, some of these sales are outside defined marketing areas. Also, some of the sales information is in milk equivalents and is not comparable for estimating product sales.

New Estimates for Manufactured Products, 1950-1965

For this article, a new series was developed showing sales of the various manufactured milk products. Additional estimates show sales for these products in terms of quantity of milkfat, total solids, and milk equivalent.

The procedure for calculating these data for manufactured dairy products is to start with the total domestic civilian and military use. Estimates of the products consumed from CCC supplies are subtracted from the total. In 1965, CCC donations of dairy products through domestic welfare programs amounted to 4.0 billion pounds milk equivalent, fat solids basis. The total sales is then divided by the U.S. resident population to determine the per capita sales. This population represents the total population consuming purchased products.

For fluid milk and cream, about 5 percent of the total consumption is on farms where milk is produced. But in the case of manufactured products, farm production has virtually disappeared, so sales are made to the farm population as well as the nonfarm group.

Military use in recent years has accounted for about 3 percent of domestic use. USDA receives periodic reports from the Department of Defense on food procurement through regional supply centers. However, these reports have limited value in the case of dairy products, because fluid milk products, cottage cheese, and ice cream, are procured by local military installations. Thus, USDA estimates are primarily-based on military population and per capita use, so a division of supplies into military and civilian segments may contain estimating errors.

Table 8.--Milk and dairy products sales (domestic disappearance, commercial sources) total and per capita, United States, 1950-65 1/

Year	Fluid milk products sales						Cheese			Evaporated and condensed			Frozen products					Dry milk products				
	Fluid whole milk	Cream 2/	Low fat milk 3/	Total: Product weight	Total: Whole milk equivalent 4/	Butter	Whole and part skim milk cheese 5/: American	Whole and part skim milk cheese 5/: Other	Cottage cheese	Evaporated whole milk	Condensed whole milk	Evaporated and condensed skim milk	Ice cream	Ice milk	Sherbet	Other frozen dairy products	Mellorine	Dry whole milk	Nonfat dry milk	Dry buttermilk	Dry whey	Malted milk
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. gal.	Mil. gal.	Mil. gal.	Mil. gal.	Mil. gal.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.
	Total																					
1950	37,270	1,496	2,096	40,862	43,092	1,371	809	333	462	2,794	300	761	554	37	17	8	---	49	524	23	23	25
1951	38,593	1,521	2,380	42,494	44,362	1,288	778	324	507	2,602	299	721	569	46	20	9	---	61	633	19	21	26
1952	39,925	1,469	2,581	43,975	45,464	1,167	826	353	528	2,562	296	700	593	54	26	9	11	86	703	32	25	30
1953	40,660	1,473	2,766	44,898	46,198	1,147	789	372	570	2,510	308	735	605	65	31	9	24	51	639	34	28	29
1954	42,207	1,446	2,851	46,504	47,726	1,198	832	385	612	2,430	318	764	597	80	34	5	31	38	672	38	28	28
1955	43,883	1,456	3,033	48,372	49,386	1,225	796	412	640	2,383	329	758	629	90	37	3	32	45	809	40	32	29
1956	45,504	1,516	3,188	50,208	51,006	1,228	807	428	743	2,322	370	749	641	103	36	3	33	52	776	49	32	28
1957	46,514	1,527	3,373	51,414	52,097	1,252	778	434	774	2,260	388	769	651	111	37	3	34	41	801	56	46	30
1958	46,839	1,514	3,494	51,847	52,407	1,217	816	455	789	2,162	424	727	658	117	37	4	40	50	821	65	47	30
1959	47,150	1,521	3,776	52,447	52,724	1,205	875	497	826	2,110	434	796	699	134	40	4	42	50	944	69	49	23
1960	47,523	1,564	4,095	53,182	53,178	1,217	947	525	857	2,043	451	796	700	145	41	5	45	57	1,000	71	55	22
1961	47,016	1,539	4,499	53,054	52,636	1,162	1,015	523	841	1,980	468	868	699	164	40	4	48	53	963	70	54	21
1962	47,917	1,543	4,862	54,321	53,590	1,166	981	568	852	1,904	432	887	704	188	41	5	51	62	944	74	57	21
1963	49,052	1,502	5,282	55,836	54,777	1,100	1,018	580	868	1,796	415	847	718	203	42	5	51	49	924	74	63	20
1964	49,644	1,472	5,920	57,036	55,507	1,114	1,042	623	896	1,745	443	889	736	219	44	6	51	60	980	73	72	20
1965 6/	50,169	1,458	6,446	58,073	56,045	1,116	1,097	645	906	1,665	467	891	753	236	44	6	52	57	982	79	80	20
	Per capita 7/																					
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Gal.	Gal.	Gal.	Gal.	Gal.	Lb.	Lb.	Lb.	Lb.	Lb.
1950	278	11.1	15.6	304	321	9.1	5.4	2.2	3.1	18.5	2.0	5.0	3.7	0.2	0.1	0.1	---	0.3	3.5	0.2	0.2	0.2
1951	282	11.1	17.4	310	324	8.4	5.1	2.1	3.3	17.0	2.0	4.7	3.7	.3	.1	.1	---	.4	4.1	.1	.1	.2
1952	285	10.5	18.5	314	325	7.5	5.3	2.3	3.4	16.5	1.9	4.5	3.8	.3	.2	.1	0.1	.6	4.5	.2	.2	.2
1953	284	10.3	19.3	313	322	7.3	5.0	2.4	3.6	15.9	1.9	4.6	3.8	.4	.2	.1	.2	.3	4.0	.2	.2	.2
1954	287	9.8	19.4	316	324	7.4	5.2	2.4	3.8	15.1	2.0	4.7	3.7	.5	.2	8/	.2	.2	4.2	.2	.2	.2
1955	291	9.7	20.1	321	327	7.5	4.8	2.5	3.9	14.5	2.0	4.6	3.8	.5	.2	8/	.2	.3	4.9	.2	.2	.2
1956	295	9.8	20.6	325	330	7.3	4.8	2.6	4.4	13.9	2.2	4.5	3.8	.6	.2	8/	.2	.3	4.6	.3	.2	.2
1957	293	9.6	21.2	324	328	7.3	4.6	2.5	4.5	13.3	2.3	4.5	3.8	.7	.2	8/	.2	.2	4.7	.3	.3	.2
1958	288	9.3	21.5	319	322	7.0	4.7	2.6	4.6	12.5	2.4	4.2	3.8	.7	.2	8/	.2	.3	4.7	.4	.3	.2
1959	283	9.1	22.7	315	316	6.8	5.0	2.8	4.7	12.0	2.5	4.5	4.0	.8	.2	8/	.2	.3	5.4	.4	.3	.1
1960	278	9.1	23.9	311	311	6.8	5.3	2.9	4.8	11.4	2.5	4.4	3.9	.8	.2	8/	.3	.3	5.6	.4	.3	.1
1961	269	8.8	25.7	303	301	6.3	5.5	2.9	4.6	10.8	2.6	4.7	3.8	.9	.2	8/	.3	.3	5.3	.4	.3	.1
1962	268	8.6	27.2	304	300	6.3	5.3	3.1	4.6	10.2	2.3	4.8	3.8	1.0	.2	8/	.3	.3	5.1	.4	.3	.1
1963	269	8.2	29.0	307	301	5.8	5.4	3.1	4.6	9.5	2.2	4.5	3.8	1.1	.2	8/	.3	.3	4.9	.4	.3	.1
1964	268	7.9	31.9	308	299	5.8	5.4	3.3	4.7	9.1	2.3	4.6	3.8	1.1	.2	8/	.3	.3	5.1	.4	.4	.1
1965 6/	266	7.7	34.2	308	298	5.8	5.7	3.3	4.7	8.6	2.4	4.6	3.9	1.2	.2	8/	.3	.3	5.1	.4	.4	.1

1/ Excludes milk used on farms where produced and distribution from USDA supplies.
2/ Includes milk and cream mixtures.
3/ Includes skimmilk, buttermilk, and flavored milk drinks.
4/ Fat solids basis.
5/ Excludes cottage cheese.
6/ Preliminary.
7/ Based on resident population, except fluid milk product sales are based on estimated population using fluid products from purchased sources.
8/ Less than 0.05.

Among the various manufactured products, sales for most products continued to increase in 1965, but evaporated milk sales continued the downtrend of recent years shown by consumption data. Per capita butter sales were maintained in 1965, while per capita butter consumption fell from 6.8 pounds in 1964 to 6.5 pounds in 1965. Cheese and frozen products sales continued to rise faster than the rate of population growth. Condensed and dry milk products sales advanced at slower rates. However, sales of nonfat dry milk were 5.1 pounds per person, same as a year earlier, compared with consumption of 5.9 pounds down slightly from 1964 (table 8).

Another new series was developed showing sales of milk and manufactured dairy products in terms of milk equivalent--fat solids basis, nonfat solids basis, and total solids basis (table 9).

U.S. milkfat production has been relatively stable since World War II because the declining average fat content has offset larger milk output. But the proportion marketed by farmers as milk and cream has continued to increase so commercial milkfat supplies have risen. Total sales of milkfat in fluid and manufactured products increased further in 1965--largely because of rising cheese use--and the gain was at a greater rate than population growth, so per capita sales gained slightly.

Milk sold as whole milk by farmers has trended upward more rapidly than farm sales of milkfat in the postwar period. Even though consumption of milk solids-not-fat from sales of dairy products have been gaining a little faster than population growth, the difference between farm marketings of solids-not-fat and commercial sales has continued large. The use of most skim milk products has been well maintained or has increased. The decrease in fluid whole milk use per person has lowered per capita sales of nonfat solids in that product. However, this decline has been offset by increased sales of nonfat solids in skim milk, so total sales of solids-not-fat in fluid products has grown.

Per capita sales rose in terms of solids-not-fat, fell in terms of milkfat, and remained about the same in terms of total solids. However, whether measured as product pounds, milk equivalent, or total milk solids, total sales in 1965 set a record, while total domestic civilian disappearance declined from 1964. Change shown by these new measures of sales are less abrupt than trends in domestic civilian consumption, on a milk equivalent basis. Estimates of per capita sales of all products combined (total solids basis) show a slight rise from 1950 to 1960 and then a decline. Estimates of sales in terms of milk equivalent on a fat solids basis are actually higher than sales on a milk equivalent, nonfat solids basis, because a larger proportion of milkfat supplies are consumed by humans. But, sales on a fat solids basis have trended downward since 1950, while on a nonfat solids basis sales have followed a steadier pattern since 1956. The downtrend in milkfat sales is due chiefly to declining butter sales.

The impact of the Food Stamp Program on commercial sales of milk and dairy products or purchases by recipients is not directly measurable. However, research findings indicate the program does expand food consumption and use of higher value dairy products. Recipients can spend coupons on a wider variety of foods, including milk and dairy products, than are available through distribution programs. The program was shifted to a permanant basis in 1964. Participation rose from about 372,000 persons in June 1964 to 633,000 by June 1965. As of March 1966, the program was providing assistance to 1,038,000 persons.

Noncommercial Use 1950-65

Domestic consumption of butter and cheese under USDA distribution programs averaged 5.6 billion pounds milk equivalent in 1962-64, but declined to 4.0 billion in 1965. This

Table 9.--Annual sales of dairy products, various measures, United States, 1950-65 1/

Year	Milk solids			Milk equivalent		
	Fat	Nonfat	Total	Fat solids basis	Nonfat solids basis 2/	Total solids basis 3/
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.
	Total					
1950	3,865	5,362	9,227	97,353	61,420	72,711
1951	3,798	5,468	9,266	96,845	62,706	73,249
1952	3,761	5,734	9,495	96,816	65,908	75,357
1953	3,734	5,826	9,560	96,773	67,043	76,115
1954	3,854	5,995	9,849	99,977	68,987	78,478
1955	3,957	6,274	10,231	102,718	72,281	81,717
1956	4,017	6,478	10,495	104,933	74,717	84,027
1957	4,046	6,658	10,704	106,328	76,882	85,838
1958	4,030	6,725	10,755	106,579	77,746	86,525
1959	4,073	6,954	11,027	108,297	80,486	88,927
1960	4,123	7,144	11,267	109,747	82,685	90,863
1961	4,073	7,159	11,232	108,587	82,859	90,654
1962	4,094	7,270	11,364	109,699	84,241	91,867
1963	4,098	7,307	11,405	110,391	84,768	92,498
1964	4,165	7,488	11,653	112,616	86,868	94,586
1965	4,236	7,545	11,781	114,415	87,529	95,547
	Per capita 4/					
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
1950	25.6	35.5	61.1	644	406	481
1951	24.8	35.7	60.5	632	409	478
1952	24.2	36.8	61.0	622	423	484
1953	23.6	36.8	60.4	612	424	481
1954	23.9	37.2	61.1	620	428	487
1955	24.1	38.2	62.3	625	440	497
1956	24.0	38.7	62.7	627	447	502
1957	23.7	39.1	62.8	624	451	504
1958	23.3	38.8	62.1	615	449	499
1959	23.1	39.4	62.5	614	457	504
1960	22.9	39.7	62.6	610	459	505
1961	22.2	39.1	61.3	593	453	495
1962	22.0	39.1	61.1	590	453	494
1963	21.7	38.7	60.4	585	449	490
1964	21.8	39.1	60.9	588	454	494
1965	21.9	38.9	60.8	590	452	493

1/ Beginning 1960, includes Alaska and Hawaii. 2/ Computed from nonfat milk solids series on the basis of whole milk containing 8.62 percent solids-not-fat in 1963-65, slightly higher factors prevailed in earlier years. 3/ Computed from total milk solids series on the basis of whole milk containing 12.33 percent total solids in 1965; factors vary slightly from year to year. 4/ Based on resident population.

was due primarily to smaller available supplies. However, a significant but undetermined proportion of the decline is due to the reduction in food distribution recipients with improved economic conditions and the growth of the Food Stamp Program. In 1966-67, dairy consumption through commodity distribution programs likely will depend on available CCC supplies.

Milk consumed on farms where produced fell further in 1965 to 3.8 billion pounds (milk equivalent), primarily because fewer farms kept milk cows. Farm use has been declining almost steadily for 3 decades, from nearly one-fourth of domestic consumption in 1935 to 3 percent in 1965. The decline in farm use since 1947-49 accounted for 70 percent of the decline in per capita civilian disappearance. As the population has shifted away from the farm sector, the availability of home-produced food has declined. The relatively high money prices for commercial supplies as compared with the farm value of home-produced foods partly accounts for the failure of per capita sales of dairy products to gain.

Sales of Fluid Milk Products, 1965

Sales of fluid milk products reached a record 58.1 billion pounds in 1965, 1.8 percent higher than in 1964. Per capita sales of all fluid products, at 308 pounds, were the same as in 1964 (table 7). Per capita sales of whole milk, at 266 pounds in 1965, fell 2 pounds below the previous year; cream sales at 7.7 pounds per capita, were 0.2 pounds lower. The rise in low fat milk sales to 34.2 pounds per capita, 2.3 pounds above 1964, is a continuation of the long-time upward trend. All of these figures are estimated in terms of quantities of fluid milk products sold through regular commercial channels on a product-weight basis.

In 1965, per capita fluid milk product sales in milk equivalent terms was higher than in 1964 in 35 of the 75 Federal and State marketing areas; it was unchanged in 4 areas and lower in 36 areas. Per capita consumption ranged from close to 350 pounds, milk equivalent, in Northeastern and Lake States to less than 200 pounds in the Southeast. The national level was about 300 pounds per person. Among causes of these region to region variations in use of fluid products are relative prices, incomes, habits, and amount of substitution--both of lower-fat milk for higher-fat items and manufactured products for bottled milk.

Per capita consumption of whole milk products increased in 1965 over 1964 in 33 of the 77 marketing areas having comparable data; it decreased in 42 and was the same in 2 areas. Among various areas, per capita use ranged from 161 pounds to 323 pounds. Sales of skim milk products per person increased in 62 of 77 markets and were lower in 15 areas. Per capita consumption of skim milk products ranged from about 10 pounds to 100 pounds per person. The milk equivalent of cream sold per capita declined from a year earlier in 43 out of 76 markets; sales were about the same as 1964 in 30 areas but higher in 3. Individual use of cream products varied from less than 10 pounds milk equivalent to over 50 pounds annually.

Table 7.--Fluid milk product sales, various measures, United States, 1950-65 1/

Year	Product weight	Milk equivalent		Milk solids		
		Fat solids basis	Nonfat solids basis	Fat	Nonfat	Total
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.
	Total					
1950	40,862	43,092	40,783	1,659	3,540	5,199
1951	42,494	44,362	42,434	1,704	3,683	5,387
1952	43,975	45,464	43,894	1,737	3,806	5,543
1953	44,898	46,198	44,831	1,760	3,882	5,642
1954	46,504	47,726	46,452	1,809	4,018	5,827
1955	48,372	49,386	48,328	1,872	4,180	6,052
1956	50,208	51,006	50,178	1,928	4,340	6,268
1957	51,414	52,097	51,394	1,964	4,446	6,410
1958	51,847	52,407	51,845	1,965	4,479	6,444
1959	52,447	52,724	52,463	1,972	4,528	6,500
1960	53,182	53,178	53,210	1,989	4,592	6,581
1961	53,054	52,636	53,045	1,963	4,578	6,541
1962	54,321	53,590	54,323	1,999	4,688	6,687
1963	55,836	54,777	55,857	2,038	4,815	6,853
1964	57,036	55,507	57,081	2,059	4,920	6,979
1965 2/	58,073	56,045	58,138	2,079	5,012	7,091
	Per capita 3/					
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
1950	304	321	304	12.4	26.4	38.7
1951	310	324	310	12.4	26.9	39.3
1952	314	325	314	12.4	27.2	39.6
1953	313	322	313	12.3	27.1	39.3
1954	316	324	316	12.3	27.3	39.6
1955	321	327	320	12.4	27.7	40.1
1956	325	330	325	12.5	28.1	40.6
1957	324	328	324	12.4	28.0	40.4
1958	319	322	319	12.1	27.5	39.6
1959	315	316	315	11.8	27.2	39.0
1960	311	311	311	11.6	26.8	38.4
1961	303	301	303	11.2	26.2	37.4
1962	304	300	304	11.2	26.2	37.4
1963	307	301	307	11.2	26.4	37.6
1964	308	299	308	11.1	26.5	37.6
1965 2/	308	298	309	11.0	26.6	37.7

1/ Includes Alaska and Hawaii, beginning 1960. 2/ Preliminary. 3/ Based on estimated population using fluid products from purchased sources.